

Experiment No: 06

Experiment Name: Implementation of Dynamic Routing using RIP.

Theory:

Routing Information Protocol (RIP) is a distance-vector dynamic routing protocol that allows routers to automatically share route information. It selects paths based on hop count, with a maximum limit of 15 hops. RIP updates routing tables every 30 seconds, ensuring all routers maintain up-to-date paths. This reduces manual configuration and provides automatic adaptability in small to medium-sized networks.

Components:

1. Cisco Packet Tracer
2. Routers and Switches
3. PCs or Laptops
4. Connection cables (Straight-through & Serial DCE/DTE)

Procedure:

Task 1: RIP Configuration with Three Routers.

1. Network Overview

| Router | LAN Network | Serial Connection To | Serial Network |
|---------|----------------|----------------------|----------------|
| Router0 | 192.168.0.0/24 | Router1 | 192.168.3.0/24 |
| Router1 | 192.168.1.0/24 | Router2 | 192.168.4.0/24 |
| Router2 | 192.168.2.0/24 | Router0 | 192.168.6.0/24 |

2. Configuration Steps

- Place 3 routers, 3 switches, and 6 PCs in Cisco Packet Tracer.
- Connect PCs → Switches → Routers using straight-through cables; connect routers with serial DCE/DTE cables.

3. Assign IPs:

| |
|--|
| Router0: Fa0/0 = 192.168.0.1; Se2/0 = 192.168.3.1; Se3/0 = 192.168.6.1 |
| Router1: Fa0/0 = 192.168.1.1; Se2/0 = 192.168.3.2; Se3/0 = 192.168.4.1 |
| Router2: Fa0/0 = 192.168.2.1; Se2/0 = 192.168.4.2; Se3/0 = 192.168.6.2 |

4. Configure RIP on all routers and add networks:

| | | | | | |
|-----------------------|-------------|-------------|-------------|-------------|-------------|
| Router0 → 192.168.0.0 | 192.168.3.0 | 192.168.6.0 | 192.168.1.0 | 192.168.2.0 | 192.168.4.0 |
| Router1 → 192.168.1.0 | 192.168.3.0 | 192.168.4.0 | 192.168.6.0 | 192.168.0.0 | 192.168.2.0 |
| Router2 → 192.168.2.0 | 192.168.4.0 | 192.168.6.0 | 192.168.1.0 | 192.168.3.0 | 192.168.0.0 |

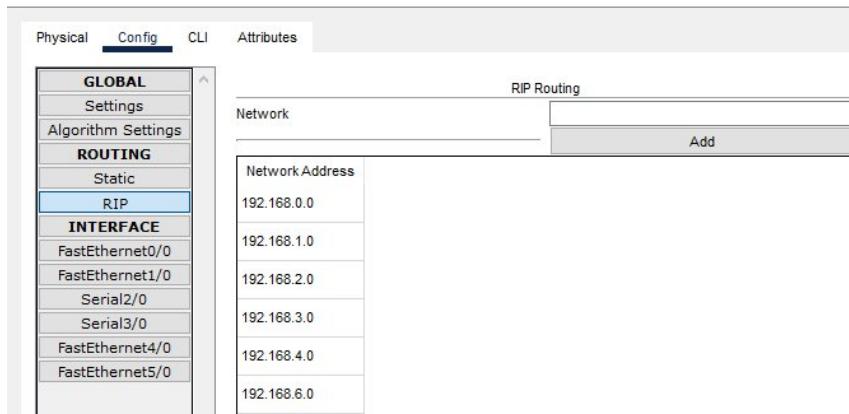


Figure 01: Input the Dynamic Routing (RIP) IP.

5. PCs configuration:

LAN A → 192.168.0.2 / Default Gateway 192.168.0.1
LAN B → 192.168.1.2 / Default Gateway 192.168.1.1
LAN C → 192.168.2.2 / Default Gateway 192.168.2.1

6. Verify connectivity with ping between all LAN PCs.



Figure 02: Filters for Simulation.

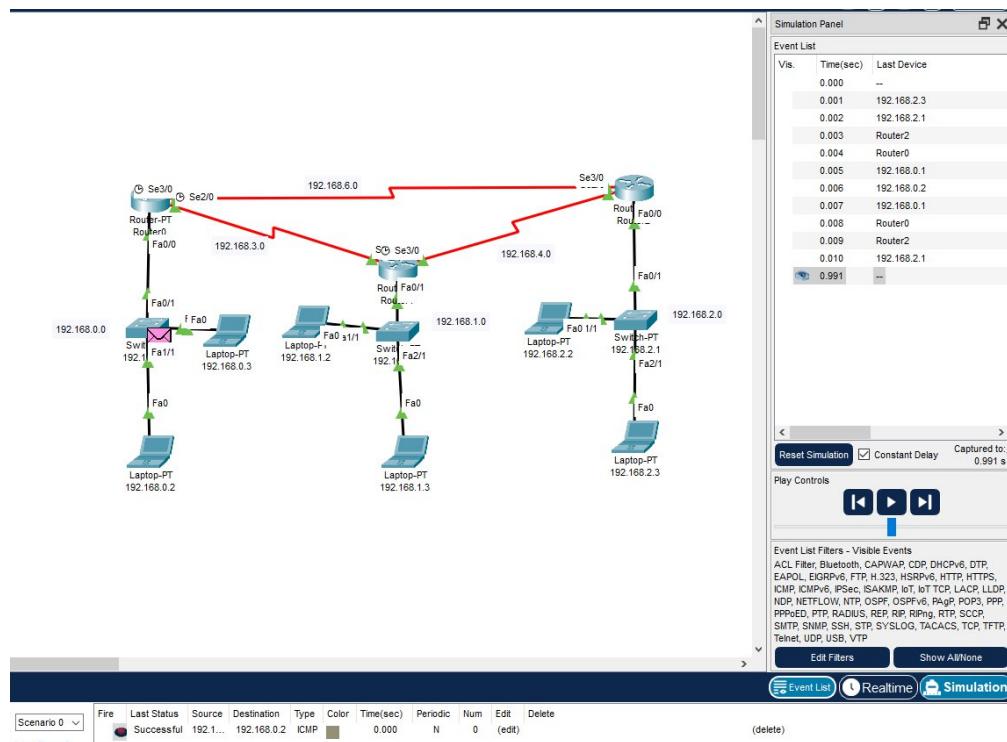


Figure 03: 3 Routers Connection by Dynamic Routing (RIP).

Task 2: RIP Configuration with Six Routers.

1. Network Overview

| Router | LAN Network | Connected To | Serial Networks |
|---------|-----------------|--------------|---|
| Router3 | 192.168.10.0/24 | R5, R6, R7 | 192.168.12.0, 192.168.17.0, 192.168.100.0 |
| Router4 | | R6, R5 | 192.168.13.0, 192.168.14.0 |
| Router5 | 192.168.11.0/24 | R3, R4, R8 | 192.168.100.0, 192.168.14.0, 192.168.15.0 |
| Router6 | | R3, R4, R7 | 192.168.12.0, 192.168.13.0, 192.168.200.0 |
| Router7 | | R3, R6, R8 | 192.168.17.0, 192.168.200.0 192.168.16.0 |
| Router8 | | R5, R7 | 192.168.15.0, 192.168.16.0 |

2. Configuration Steps

- Place 6 routers, 2 switches, 4 PCs.
 - Connect LANs and serial links as shown.

3. Assign LAN IPs:

| |
|---|
| Router3: Fa1/0 = 192.168.10.1; Se2/0 = 192.168.12.1; Se3/0 = 192.168.17.1 Se6/0 = 192.168.100.1 |
| Router4: Se2/0 = 192.168.13.2; Se3/0 = 192.168.14.1 |
| Router5: Fa0/0 = 192.168.11.1; Se2/0 = 192.168.14.2; Se3/0 = 192.168.15.1 Se6/0 = 192.168.100.2 |
| Router6: Se2/0 = 192.168.12.2; Se3/0 = 192.168.13.1 Se6/0 = 192.168.200.1 |
| Router7: Se2/0 = 192.168.16.2 Se3/0 = 192.168.17.2 Se6/0 = 192.168.200.2 |
| Router8: Se2/0 = 192.168.15.2; Se3/0 = 192.168.16.1 |

4. Configure serial interfaces:

R3 ↔ R6 → 192.168.12.0
R4 ↔ R6 → 192.168.13.0
R4 ↔ R5 → 192.168.14.0
R5 ↔ R8 → 192.168.15.0
R3 ↔ R7 → 192.168.17.0
R7 ↔ R8 → 192.168.16.0
R6 ↔ R7 → 192.168.200.0
R3 ↔ R5 → 192.168.100.0

5. Enable RIP on all routers and add all connected networks.

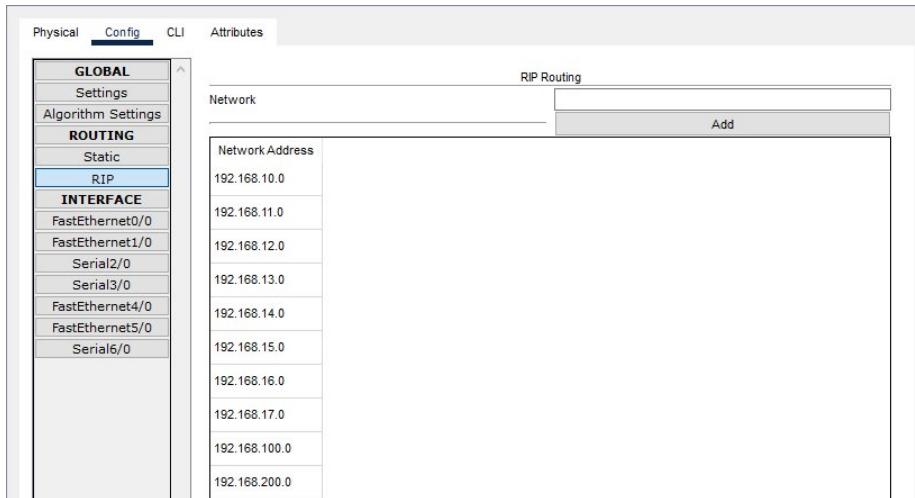


Figure 04: Input the IP in the Routing (RIP).

6. Configure PCs:

| |
|--|
| R3 LAN → 192.168.10.2 Default Gateway 192.168.10.1 |
| R5 LAN → 192.168.11.2 Default Gateway 192.168.11.1 |

7. Verify with ping between distant PCs (192.168.10.2 ↔ 192.168.11.2).

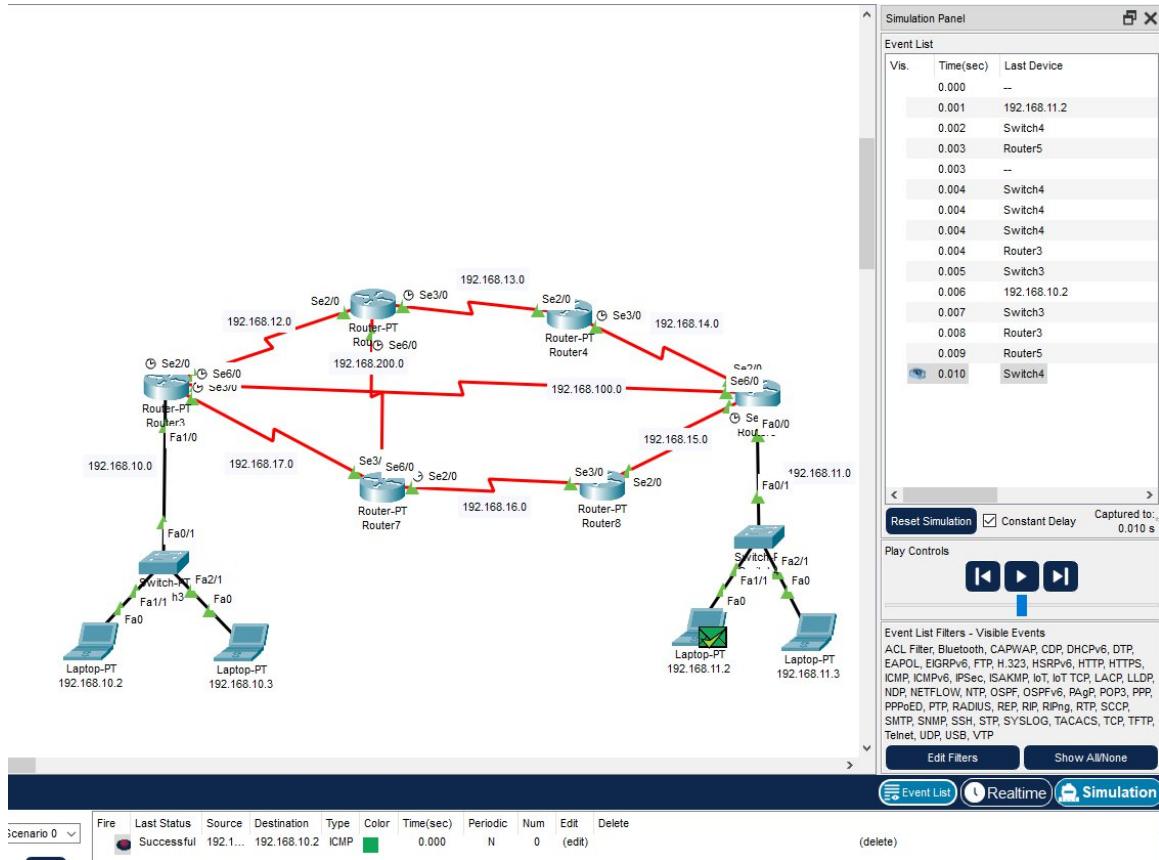


Figure 05: 6 Routers Connection by Dynamic Routing (RIP).

Conclusion:

In this experiment, dynamic routing was successfully implemented using RIP on both three-router and six-router topologies. RIP automatically shared routing information among all routers, eliminating the need for static routes. As a result, all LANs achieved full end-to-end connectivity, and data packets were efficiently routed between networks.

The verification through ping tests confirmed that the RIP protocol dynamically updated routing tables, ensuring accurate path selection and reliable communication across all connected devices. This demonstrates the effectiveness of RIP in small to medium-sized networks where simplicity and automatic route management are required.